ACC NR: AP7006049

tact as the p_1 region. The use of dual-operation thyristors opens new vistas in automatic control and regulation engineering, by making it possible to simplify old and develop new circuits which will be qualitatively superior to their currently existing counterparts: e.g., a sawtooth voltage generator, a stabilized power supply source, a high-voltage pulse generator, various relay and switching circuits, etc. Orig. art. has: 3 figures. [JPRS: 38,694]

SUB CODE: 09

Card 2/2

L 08062-67

ACC NR: AP7001673

SOURCE CODE: UR/0144/66/000/007/0773/0780

AUTHOR: Shalygin, I. V.; Kravchenko, K. F.; Kireyev, O. P.; Korobeynikov, B. A.

ORG: none

TITLE: Investigation of torque characteristics of pulse electromagnetic drives

SOURCE: IVUZ. Elektromekhanika, no. 7, 1966, 773-780

TOPIC TAGS: electromagnet, electric engineering

ABSTRACT: The authors analyze the case of drive of a mechanism the applied mass of which on the electromagnet armature is constant or changes insignificantly with time, so that the changes can be ignored. The investigation is limited to the primary function of an electromagnet, when it moves only the actuator mechanism, not when the armature is loaded with other additional forces. The torque characteristics of electromagnets are analyzed in dependence on the form of the air gap between the armature and the stop. A two stage torque characteristic is useful to reduce shock loads in the actuating mechanism. The usage of a two stage torque characteristic in combination with a return spring can reduce or completely eliminate shock loads in the actuating mechanism. With identical parameters of the process, torque characteristic variants with force changes require a considerable increase in initial electromagnet force and strength of the mechanism. Orig. art. has: 3 figures and 15 formulas. [JPRS: 38,490]

SUB CODE: 09 / SUBM DATE: 21Dec65 / ORIG REF: 003

Card 1/1 pla

UDC: 621.3.018.7+621.374.3

0924 1441

KOROBEYNIKOV, B.P.

3
1-4648

Korobeinikov, B. P. On the integral equations of unsteady adiabatic gas motion. Translated by Morris D. Friedman, 572 California St., Newtonville 60, Mass., 1956. 6 pp.

Translated from Dokl. Akad. Nauk SSSR (N.S.) 104 (1955), 509–512. The original Russian article was reviewed in MR 17, 1150.

L 9558-66 EWT(m)/EPF(n)-2/EWP(t)/EWP(b) IJP(c) ES/JD/WW/JG/GG

ACC NR: AP5026444 SOURCE CODE: UR/0089/65/019/004/0372/0380

AUTHOR: Butra, F. P.; Yevkina, Z. F.; Fufayeva, O. L.; Korobeynikov, I. A.; Lebedev, L. M.

ORG: none

TITLE: The effect of temperature and neutron irradiation on plastic deformation of alpha uranium monocrystals

SOURCE: Atomnaya energiya, v. 19, no. 4, 1965, 372-380

TOPIC TAGS: radiation defect, radiation damage, neutron bombardment, uranium

ABSTRACT: The effect of temperature, crystal orientation, and neutron irradiation on the plastic deformation of alpha uranium monocrystals was investigated. The shape of the stress-strain curves of unirradiated samples was explained in terms of the plastic deformation modes. The effect of neutron irradiation on plastic deformation was investigated on 9 x 1.5 x 0.4—0.5 mm monocrystalline samples grown by $\beta \rightarrow \alpha$ recrystallization. The samples were exposed to integrated fluxes (nvt) up to 10^{17} n/cm^2 and to 4×10^{20} n/cm^2 at temperatures not exceeding 100C and subjected to tensile tests. X-rays and metallographic investigations have shown that exposure to nvt up to 1.6×10^{16} n/cm^2 does not change the plastic deformation mode. In crystals in which initial deformation occurred by slip along the plane (010) the yield point increased rapidly at small nvt, reaching saturation at 10^{17} n/cm^2. Irradiation caused a 3—5-fold increase in

Card 1/2 UDC: 621.039.553

L 9558-66

ACC NR: AP5026444

the critical shear stress and decreased elongation from ~65% to ~40%. Annealing at 450C of crystals exposed up to 5.5×10^{17} n/cm^2 restored the mechanical properties of the samples. Orig. art. has: 14 figures. [CS]

SUB CODE: SS/ SUBM DATE: 22Feb65/ ORIG REF: 006/ OTH REF: 012/ ATD PRESS: 4151

bch

Card 2/2

KOROBEYNIKOV, Ivan Nefedovich; LUTRIKH, German Oskarovich; RUMYANTSEV, A.A., red.; TELYASHOV, R.Kh., red.izd-va; GVIRTS, V.L., tekhn. red.

[Mechanization and automation practices in factories engaged in assembling television receivers with printed circuit components]Zavodskoi opyt mekhanizatsii i avtomatizatsii protsessov montazha i sborki televizorov na pechatnykh platakh. Leningrad, 1962. 17 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Obmen peredovym opytom. Seriia: Pribory i elementy avtomatiki, no.16) (MIRA 16:3)
(Television) (Printed circuits)

Korobeynikov, I. Ye.

PHASE I BOOK EXPLOITATION SOV/3432

Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Sverdlovskoye otdeleniye

Mekhanizatsiya i avtomatizatsiya mashinostroitel'nogo proizvodstva [illegible] ation and Automation in the Machine-Building Industry) [illegible] 1959. 519 p. 12,000 copies printed.

Ed.: Ya. V. Fal'kov, Doctor of Technical Sciences; Tech. Ed.: [illegible] Editorial Board: P. P. Vshivkov, Engineer, V. V. [illegible] Technical Sciences, Ya. V. Fal'kov, Doctor of [illegible] Porochikov, Candidate of Technical Sciences, V. V. [illegible] Technical Sciences, K. N. Sobolev, Candidate of [illegible] Sokolovskiy, Candidate of Technical Sciences, M. [illegible] B. K. Shumayev, Candidate of Technical Sciences, and P. V. [illegible] sor.

PURPOSE: This book is intended for production engineers and [illegible] in industrial planning.

COVERAGE: The material presented in this book is said to [illegible] developed and tested in the machine-building plants of [illegible] of Siberia. Listed are various methods of mechanization [illegible] and their applications in foundries, forging shops, [illegible] Other fields of use include welding, hoisting, conveying, [illegible] quality control on an industrial scale. Various mechanisms, devices, [illegible] and instruments currently used in mechanization and automation of these in- dustrial processes are described and illustrated. The equipment [illegible] said to have been produced by the plants using their own resources. [illegible] economic aspects of mechanization and automation are discussed. There are [illegible]

Mechanization and Automation (Cont.) SOV/3432

AVAILABLE: Library of Congress

KOROBEYNIKOV, I.Ye.

KOROBEYNIKOV, I.Ye.; RODIGIN, N.M.

Possibility of measuring the parameters of a conducting magnetic material plate by means of eddy currents. Fiz. met. metalloved. 13 no.5:666-670 My '62. (MIRA 15:6)

1. Institut fiziki metallov AN SSSR.
(Electromagnetism)
(Electric currents, Eddy)

KOROBEYNIKOV, K.

Decentralized operation of receipt of payments. Den. i kred. 16 no.10:80-81 O '58. (MIRA 11:11)

(Nizhniy Tagil--Payment)

electron electron positron ... beams

... Institute of Nuclear Physics ...
programs on high-energy particle physics ... concerned with ... charged particle beams. The Inst... available

Card

L 47304-65
ACCESSION NR: AT5007921

for its purpose to install huge accelerators whose construction requires large resources outlaid and long time. For work on colliding electron-electron, positron-electron, and proton-proton beams, three installations are being built, which are in various stages of readiness. Work on colliding electron beams was conducted at the institute (then a laboratory of the Institute of Atomic Energy imeni I. V. Kurchatov) in the Fall of 1956, after Kerst's report on accelerators with colliding proton beams of the FFAG type. By that time Soviet scientists had already acquired some experience in obtaining large electron currents; in particular, the mentioned laboratory had installed and then abandoned a device for the spiral storage of electrons (G. I. Budker and A. A. Naumov, CERN Symposium, 1, 76 (1956)), by which, subsequently, circulating currents of the order of 100 amperes were obtained. In 1957 two variants of this device were considered at the same time. The first one consisted of two accelerators with spiral storage and subsequent transition of the particles to synchrotron state in comparatively narrow paths. The second one had storage rings with constant magnetic field and frequent external injection because of the damping of the oscillations under the action of radiation. The first variant was more cumbersome; the second variant contained an element not developed at that time, namely a 100-kilovolt commutator of 10 kilo-amperes with nanosecond front. At the end of 1957, the first positive results were obtained

Card 2/5

L 47304-65

ACCESSION NR: AT5007921

[illegible] discharger of 100 kilovolts, and work stopped on the variant with [illegible]

[illegible] and as a device for [illegible] experiments at low [illegible] from the Panofsky report in 1958 on his work with colliding electron [illegible]

[illegible] beams with energies [illegible] 1958 [illegible]

[illegible] path of 700 Mev energy. [illegible] and VEPP-2 are installed in Novosibirsk. The VEP-1 is in a state of neglect, but at the end of 1964 experiments will be begun with it. Installation of the VEPP-2 has been completed. To obtain a marked effect from the application of colliding proton beams, an accelerator is needed with an energy of at least 10 Gev. Since the ordinary accelerator at such energies is a very bulky machine, it was decided to combine the idea of colliding proton beams with the creation of an iron-less impulse accelerator with very large fields and a neutralized central busbar. This latter work of creating such a machine was reported by the authors at a Moscow conference

Card 3/5

held in 1956. The presence of a field with two directions in an iron-less accelerator with central busbar permits the acceleration of protons toward opposite sides in one machine, which makes possible the collision of protons in case of a suitable race-track. At the present time the Institute is developing a proton device with a magnetic field of about 200 kilogauss and radius of 2 meters for a particle energy of 12 Gev in the beam (equivalent energy is around 300Gev). Tests are being conducted on models, and an effective method of injection by overcharging of negative ions is under study. Also under development are an impulse electric power supply system of 100 million joules capacity and an hf power supply. Since 1958 the Institute has been conducting theoretical investigations on the limits of applicability of quantum electrodynamics [V. N. Bayyer, ZhETF, 37, 1490 (1959), and UFN, 78, 619 (1962)] for the calculation of the radiational corrections to the electrodynamic cross-sections [V. N. Bayyer and S. A. Kheyfets, ZhETF 40, 613-715 (1961) and Nuclear Physics (in print)], and on other problems of high-energy particle physics that are connected with the preparation of experiments on colliding beams [V. N. Bayyer, I. B. Khriplovich, V. V. Sokolov, and V. S. Synakh, in ZhTF, 1961]. The present report takes up under the mentioned three main headings the following pertinent topics: the accelerator-injection, storage paths, electron-optical channel,

L 47304-65

ACCESSION NR: AT5007921

input and output system, experiments on storage, proposed work, experimental set-up, physical layout of magnets, power supply, etc. Orig. art. has: 8 figures.

ASSOCIATION: Institut yadernoy fiziki SO AN SSSR (Institute of Nuclear Physics, SO AN SSSR)

SUBMITTED: 26May64 ENCL: 00 SUB CODE: EE, NP

NO REF SOV: 012 OTHER: 003

L 3607-66 EWT(1) IJP(c)
ACCESSION NR: AP5021360

UR/0120/65/000/004/0188/0191
621.317.44

AUTHOR: Babenko, N. S.; Korobeynikov, L. S.

TITLE: Vibrational sensor of the relative gradient of the constant magnetic field

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1965, 188-191

TOPIC TAGS: magnetic field measurement, constant magnetic field, physics laboratory instrument

ABSTRACT: The existing sensors of magnetic fields are divided into turning, rotating, and vibrational devices. This article presents the theory, error estimate, design, and test results of a vibrational magnetic field sensor (N. S. Babenko, L. S. Korobeynikov, Avt. zayavka [Author's patent application] no. 828619/26-10) distinguished by the absence of external motors. It can be used for continuous registration of the magnetic field decrease index. Two recording coils located within the general working volume are brought into oscillation by a third, AC, coil between the other two. The sensitivity of Hv sensor together with the associated circuitry is about 0.1 Gauss/cm/division. Field gradient

Card 1/2

Card 2/2

L 07062-67 EWT(m) IJP(c)

ACC NR: AP6021624 (N) SOURCE CODE: UR/0089/66/020/003/0220/0223

AUTHOR: Zinin, E. I.; Korobeynikov, L. S.; Kulipanov, G. N.; Lazarenko, B. L.; Matveyev, Yu. G.; Popov, S. G.; Skrinskiy, A. N.; Starodubtseva, T. P.; Tumaykin, G. M.

ORG: none

52
B

TITLE: Control and regulation system for the electron beam parameters in the VEP-1 electron-electron storage ring

79

SOURCE: Atomnaya energiya, v. 20, no. 3, 1966, 220-223

TOPIC TAGS: electron beam, electron accelerator, storage ring, plasmoid acceleration, synchrotron radiation

ABSTRACT: The authors describe briefly the main systems used for different stages of adjustment and physical research of the VEP-1 assembly, first described by G. I. Budker et al. (Atomnaya energiya v. 19, 498, 1965). The parameters investigated were the magnitude of the injected current, the angular divergence and transverse dimensions of the beam, its energy and energy spread, and the position and angle at the exit from the electron-optical channel. The number of injected particles and the phase difference between the input and output were measured with lead probes. The first revolutions of the captured current were observed by recording the synchrotron radiation with a photomultiplier. The captured and stored currents were also measured with the aid of the synchrotron radiation. The radial position of the orbits was controlled either by regulating their radii by changing the frequency of the accelerating

Card 1/2 UDC: 621.384.6

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000824730003-4"

L 07062-67

ACC NR: AP6021624

voltage or by producing azimuthal modifications of the magnetic field with additional turns. The positions of the orbits at the collision location were roughly monitored by means of an optical television system, and more accurately by a remotely controlled diaphragm located at the place of encounter. The systems used to measure the luminosity, to control the radial and azimuthal positions of the plasmoids, to determine the phase dimensions of the plasmoids, and to monitor and study various coherence effects are briefly described. The lifetime of the beam was monitored continuously with a special electronic system which determined the logarithmic derivative of a signal proportional to the current in the track. Orig. art. has: 6 figures.

SUB CODE: 20/ SUBM DATE: 22Nov65/ ORIG REF: 001/ OTH REF: 001

Card 2/2

KOROBEYNIKOV, M., podpolkovnik.

Training in firing on the move. Voen.vest. 36 no.8:30-34 Ag '56. (MLRA 9:10)

(Shooting, Military)

KOROBEYNIKOV, M., podpolkovnik, kand.pedagogicheskikh nauk; OFITSEROV, V., podpolkovnik; RUBAKHIN, V., podpolkovnik, kand.pedagogicheskikh nauk

"Psychology; studies on the education and training of Soviet soldiers" by G. D. Lukov. Reviewed by M. Korobeinikov., V. Ofitserov, V. Rubakhin. Voen.vest. 40 no.10:121-122 O '60. (MIRA 14:5)
(Psychology, Military)
(Lukov, G. D.)

MEZENTSEV, G., kapitan; KOROBEYNIKOV, M., podpolkovnik, kand.ped.nauk

Is Lt. Colonel P. Novikov correct? Reactions to an article published in no. 4. Voen.vest. 38 no.12:64-66 D '58. (MIRA 12:1)
(Shooting, Military)

KOROBEYNIKOV, M., podpolkovnik, kand. pedagogicheskikh nauk

Skill and habits. Voen .vest. 40 no.11:92-95 N '60.
(MIRA 14:11)

(Military education)
(Learning, Psychology of)
(Habit)

D'YACHENKO, M., podpolkovnik, kand. pedagogicheskikh nauk;
KOROBEYNIKOV, M., polkovnik, kand. pedagogicheskikh nauk;
KRAVCHUN, N., kapitan 2-go ranga, kand. pedagogicheskikh nauk

Psychological and pedagogical principles in the training and education of soldiers and sailors. Komm. Vooruzh. Sil 4 no.22:68-75 N '63. (MIRA 17:1)

KOROBEYNIKOV, M., polkovnik, kand. pedagogicheskikh nauk

How the conduct of a soldier in a dangerous situation is determined. Komm. Vooruzh. Sil 46 no.14:32-37 Jl '65. (MIRA 18:7)

KOROBEYNIKOV, M.F., inzh.; TARASOV, S.A., inzh.

Improvement of the production of woodpulp. Bum. prom. no.2:18-20 F '64. (MIRA 17:3)

1. Voloshskiy tsellyuloznyy zavod.

USOV, Ya.A.; KOROBEYNIKOV, M.I.; MAMEDOV, K.I.

Sanitary protection of the frontiers in the territory of the Uzbek S.S.R. Zhur.mikrobiol., epid.i immun. 32 no.12:30-33 D '61. (MIRA 15:11)

1. Iz Uzbekskoy respublikanskoy protivochumnoy stantsii, Tashkent, Sanitarno-karantinnogo punkta Tashkentskogo aeroporta i Surgan-Dar'inskoy oblastnoy sanitarno-epidemiologicheskoy stantsii, Termez.

(UZBEKISTAN--QUARANTINE)

KIRICHENKO, Vasiliy Stepanovich, inzh.; FEYGEL'SON, B.Yu., kand.tekhn. nauk, retsenzent; SUDAKIN, Ya.A., red.inzh.; pri uchastii: PORVATOV, N.A., inzh.; KRASAVIN, D.P., inzh.; KOROBEYNIKOV, M.M., inzh.; ROGOZHKIN, P.I., inzh.; YEVDOKOMOV, F.N., inzh.; STUPIN, A.N., inzh.; ZVYAGIN, A.V., inzh.; SIROTIN, A.M., red.izd-va, inzh., EL'KIND, V.D., tekhn.red.

[Water-cooled chill molds] Vodookhlazhdaemye kokili. Moskva, Gos. nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1958. 95 p. (MIRA 11:12)
(Molding (Founding))

P/

KOROBEYNIKOV, ~~M.,~~ podpolkovnik

Merited award. Voen.znan. 36 no.11:12 N'60. (MIRA 13:11)
(Russia--Army--Officers)

KOROBEYNIKOV, Maksim Petrovich, polkovnik, kand. ped. nauk; MOROZOV, Ye.N., polkovnik, red.; MASLOVA, N.Ya., tekhn. red.

[Psychology for the sergeant]Serzhantu o psikhologii. Moskva, Voenizdat, 1962. 100 p. (MIRA 15:9)
(Psychology, Military)

KOROBEYNIKOV, Maksim Petrovich, polkovnik, kand. pedagog. nauk; MOROZOV, B.N., polkovnik, red.; MASLOVA, N.Ya., tekhn.red.

[To a sergeant on psychology] Serzhantu o psikhologii. Moskva, Voen.izd-vo M-va oborony SSSR, 1962. 100 p. (MIRA 16:5)

(Psychology, Military)

ZAPOROZHETS, A.V. (Moskva); KOROBEYNIKOV, M.P. (Moskva)

New book on military psychology. Vop. psikhol. no.5:142-144
S-O '64 (MIRA 18:1)

BARABANSHCHIKOV, A.V., podpolkovnik, kand. pedag. nauk; GALKIN, M.I., polkovnik, kand. fil. nauk; D'YACHENKO, M.I., podpolkovnik, kand.ped.nauk,dots.; KOTOV, N.F., polkovnik,kand. ped.nauk; KOROBEYNIKOV, M.P., polkovnik, kand.ped.nauk; KRAVCHUN, N.S., kapitan 2 ranga, kand.ped.nauk, dots.; LUTSKOV, V.N., kand. ped. nauk, podpolkovnik; FEDENKO, N.F., kapitan, kand. ped. nauk, dots.; SHELYAG, V.V., kapitan 1 ranga, kand. fil.nauk; VOSTOKOV, Ye.I., general-mayor, kand. ist. nauk; KUBASOV, A.F., general-leytenant zapasa, red.; BELOUSOV, G.G., general-mayor, red.; TREFILOV, N.F., kapitan 2 ranga, red.; MURASHOVA, L.A., tekhn.red.

[Fundamentals of military pedagogy and psychology; a training aid] Osnovy voennoi pedagogiki i psikhologii; uchebnoe posobie. [By] A.V.Barabanshchikov i dr. Moskva, Voenizdat, 1964. 383 p. (MIRA 17:2)

AUTHOR: Korobeynikov, N., Deputy Head SOV-27-58-10-16/31

TITLE: To Meet the 40th Anniversary of the Lenin Komsomol (Navstrechu 40-letiyu Leninskogo komsomola)

PERIODICAL: Professional'no-tekhnicheskoye obrazovaniye, 1958, Nr 10, p 24 (USSR)

ABSTRACT: The author describes different achievements, records and promises made by various South-Kazakhstan schools.

ASSOCIATION: Yuzhno-Kazakhstanskoye upravleniye trudovykh rezervov. (South Kazakhstan Administration of Labor Reserves)

1. Universities

Card 1/1

68930
S/147/59/000/04/003/020
E031/E413

10.2000

AUTHOR: Korobeynikov, N.P. (Novosibirsk)

TITLE: A Sharpening of Slender Body Theory for Supersonic Flow Round Bodies of Revolution at Incidence

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya tekhnika, 1959, Nr 4, pp 26-31 (USSR)

ABSTRACT: The application of slender body theory to the flow round bodies of revolution at incidence gives simple analytical relations for the aerodynamic characteristics but these characteristics do not depend on the Mach number of the incident flow. This paper is an attempt to derive simple expressions for the calculation of the aerodynamic characteristics taking into account the Mach number. Cylindrical coordinates r, θ, s are chosen with the axis of the body pointing in the direction of the direction of the negative z-axis. In the equation for the perturbation velocity potential, a Laplace transform with respect to s is applied. The solution of the resulting equation is well known as a series of products of Bessel functions K_n and cosine terms. The velocity potential can be split into two

Card 1/3

68930
S/147/59/000/04/003/020
E031/E413

A Sharpening of Slender Body Theory for Supersonic Flow Round Bodies of Revolution at Incidence

terms, one of which is the potential for axisymmetrical flow and the other of which takes account of the incidence. It is this latter which is of interest. We obtain for the potential φ_1 the expression

$$\varphi_1 = \bar{A}_1(p)K_1(\beta pr)\sin\theta$$

where $\bar{A}_1(p)$ is an arbitrary function depending on the boundary conditions at the surface of the body, $\beta = (M^2 - 1)^{1/2}$, and p is the Laplace transform of s. As a first step in the inverting of this transform expression, the Bessel function is expanded as a series for small values of the argument (higher order terms being neglected). It is further assumed that the original of the function

$$\frac{\bar{A}_1(p)}{\beta p} = a_1(s)$$

Card 2/3 is known. The function $a_1(s)$ can be determined from

68930

S/147/59/000/04/003/020
E031/E413

A Sharpening of Slender Body Theory for Supersonic Flow Round Bodies of Revolution at Incidence

the boundary condition on the surface of the body. The expression for the pressure coefficient (given in Ref 3) can be split into two parts and in the part depending on the angle of incidence, the expression found for the potential is used. Likewise the lift and longitudinal moment are obtained. An example is given in which the lift curve slope is compared with that obtained from exact theory, linear theory and slender body theory for various nose angles. It is seen that the results of the theory described in this paper are in better agreement with those of exact theory than those obtained from linear theory. There are 2 figures and 3 English references.

SUBMITTED: June 3, 1959

Card 3/3

69314

10.6000

S/147/60/000/01/003/018
E031/E535

AUTHOR: Korobeynikov, N.P. (Novosibirsk)

TITLE: Supersonic Flow at Incidence Over "Triangular" Wings and Round Elliptic Cones with Subsonic Leading Edge 26

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya tekhnika, 1960, Nr 1, pp 28-34 (USSR)

ABSTRACT: The method used is that of the conformal transformation and the paper starts from the solution of the problem for a body of revolution with an arbitrary generator which is obtained by a sharpening of the slender body theory. The origin of coordinates is taken at the nose of the body of revolution and the expression for the perturbation velocity potential obtained as above is written down. By applying suitable conformal transformations we can then obtain the potential for any other bodies and the first example is that of a wing of zero thickness. (This is only true within the accuracy of the linearized theory). From the potential the lift can be obtained and both the general expression and that for a triangular wing are

Card 1/2

SUBMITTED: October 16, 1959

KOROBEYNIKOV, N. P. Cand Tech Sci -- "Certain problems of supersonic ambience of thin bodies." [Mos], 1961 (Mos Aviation Inst im S. Ordzhonikidze). (KL, 4-61, 197)

196

28812

10.1210

S/147/61/000/003/001/017
E031/E335

AUTHOR: Korobeynikov, N.P.

TITLE: On the calculation of the aerodynamic characteristics of thin cambered bodies and non-planar wings

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya tekhnika, no. 3, 1961, pp. 3 - 13

TEXT: Using earlier published data of the author (Ref. 2 - Sbornik trudov, no. 15, 1959) basic relations for the flow round thin cambered bodies are developed and expressions are derived for the aerodynamic characteristics of non-planar wings (having cylindrical twist) of small aspect ratio. In each chordwise section of the wing the twist is characterised by the distance $\delta(s)$ through which the origin of coordinates is displaced (s is measured along the chord). The influence of the angle of attack α can be determined as a special case of an elliptic profile. A non-planar wing is obtained by letting the minor semi-axis of the ellipse tend to zero. Expressions are derived for the pressure, lift, longitudinal moment, induced drag, spanwise pressure distribution and chordwise lift distribution.

Card 1/2

53792

10.1210

S/864/60/000/000/004/005
E031/E413

AUTHOR: Korobeynikov, N.P. (Novosibirsk)

TITLE: Supersonic flow round a body of rotation with quasi-triangular wings and elliptic taper at incidence

SOURCE: Nauchnaya konferentsiya po teoreticheskim i prikladnym voprosam matematiki i mekhaniki, Tomsk, 1960, Doklady. Tomsk, 1960. 97

TEXT: The slender body theory is made more precise by retaining in the solution of the linear equations for the potential terms of a higher order in the thickness parameter. If the taper is circular the expressions for a body of rotation are simpler than those of linear theory and the results of calculations agree better with those of exact theory and with experiment. Expressions are obtained for the lift coefficient and the longitudinal moment about the nose. By using conformal transformations the solution of the problem of the flow round quasi-triangular wings of small aspect ratio and elliptic taper at incidence can be obtained. The results of calculations of the ratio of the lift coefficient to the angle of incidence for wings of the same aspect ratio with convex, straight and concave leading edges show that as the concavity

Card 1/2

increases the ratio falls (at constant Mach number at infinity) while with increase in convexity the ratio increases. New expressions are given for calculating the aerodynamic characteristics of elliptic taper, which are satisfactory for various geometrical parameters, small angles of incidence and Mach numbers up to 3.

MERLICH, B.V.; DATSENKO, N.M.; KOROBEYNIKOV, N.S.

Time of the oxidizing disintegration of sulfur ores in the Rozdol deposit. Min. sbor. no.17:105-112 '63. (MIRA 17:11)

1. Gosudarstvennyy universitet imeni Franko, L'vov.

DRUGOV, A.; KOROBEYNIKOV, P. (Ryazan')

Amateur design of a television set. Radio no.7:31-33 Jl '60.
(MIRA 13:7)

(Television--Receivers and reception)

KOROBEYNIKOV, P.

Scanning stage. Radio no.8:25-33 Ag '60. (MIRA 13:8)
(Television--Receivers and reception)

KOROBEYNIKOV, P.

Television receiver units. Radio no.9:28-32 S '60. (MIRA 13:10)
(Television--Receivers and reception)

KOROBEYNIKOV, P.

Improvement of an amateur television receiver. Radio no. 11:40-43 N '60.
(MIRA 14:1)
(Television--Receivers and reception)

KOROBEYNIKOV, P. (g. Ryazan'); ROZENFEL'D, Ya. (g. Odessa)

Repairing amateur television receivers. Radio no.6:52 Je '61. (MIRA 14:10)

(Television--Receivers)

KAMENSKAYA, Yu., inzh.; KORODEYNIKOV, P., kand.tekhn.nauk

PTK television converter. Radio no.2:18-24 F '62. (MIRA 15:1)
(Television--Receivers and reception)

KOROBEYNIKOV, P., inzh. (g. Ryazan')

Automatic frequency control of a heterodyne. Radio no.5:43-45 My '61. (MIRA 14:7)

(Television--Receivers and reception)
(Frequency regulation)

KOROBEYNIKOV, P.

A high-frequency block instead of the PTK unit. Radio no.9:41 S '62. (MIRA 15:9)

(Television)

KOROBEYNIKOV, Petr Grigor'yevich, kand. tekhn. nauk; SAL'MANOV, Rifkat Nigmatzyanovich; BATURINA, A.S., red.; FEDOROVA, V.V., tekhn. red.

[Mine development] Gornopodgotovitel'nye raboty. Magadan, Magadanskoe knizhnoe izd-vo, 1960. 68 p. (MIRA 14:9)
(Magadan Province—Strip mining)

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000824730003-4"

KOROBEYNIKOV, P. M.

My Experience With New Types of Electric Saws (Moy opyt raboty elektropilami novykh konstruktsii)) (electric sawer of distinction, Udmurt ASSR), Goslesbumizdat, 1949, 32 pp.

KOROBEYNIKOV, P. V.

"Automatization of Projection-Dimension Measurement Processes in Machine Building." Cand Tech Sci, Moscow Machine Tool and Tool Inst imeni I. V. Stalin, 1 Dec 54. (VM, 19 Nov 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (11)

SO: Sum. No. 521, 2 Jun 55

KOROBEYNIKOV, Petr Vasil'yevich; LOPATIN, K.G., red.; FRIDKIN, L.M., tekhn. red.

[How to build a television receiver] Kak postroit' televizor. Moskva, Gosenergoizdat, 1963. 60 p. (Massovaia radiobiblioteka, no.473) (MIRA 17:1)

KOROBEYNIKOV, V.A.

Cyclic changes over the last several years in the ground-water level and natural processes. Razved. i okh. n[illegible] [illegible]-53 Ja '65. ([illegible] [illegible]:3)

1. Gosudarstvennyy geologicheskiy komitet RSFSR.

KOROBEYNIKOV, V.A.; YELFIMOV, T.N.

Preserving rock patterns. Razved. i okh. nedr 26 no.6:42-43 Je '60. (MIRA 15:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut gidrogeologii i inzhenernoy geologii (for Korobeynikov). 2. Gidrogeologicheskaya stantsiya TSentral'no-chernozemnoy oblasti (for Yelfimov).
(Petrology)

KOROBEYNIKOV, V.A.

Rhythms of the variations in ground water level over a period of many years. Trudy VSEGINGEO no.10:86-88 '64.
(MIRA 17:10)

1. Gidrogeologicheskaya stantsiya TSentral'no-Chernozemnoy polosy.

KOROBEYNIKOV, V.A.; VAYNER, L.S.

Brief result of and prospects for the study of the regime of underground waters in the Central Black Earth region. Trudy VSEGINGEO no.10:202-205 '64.

(MIRA 17:10)

1. Gidrogeologicheskaya stantsiya TSentral'no-Chernozemnoy polosy.

KOROBEYNIKOV, V.G., inzh.; GARATUYEV, M.V.

Automatic line for machining motorcycle rollers. Mekh. i avtom. proizv. 18 no.12:1-5 D '64. (MIRA 18:3)

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000824730003-4"

PHASE I BOOK EXPLOITATION SOV/5309

Korobeynikov, Vitaliy Grigor'yevich, Boris Aleksandrovich Sak-Shak, and Yuriy Leonidovich Tetelyutin

Avtomatizatsiya universal'nykh metallorezhushchikh stankov (Automation of Universal Metal-Cutting Machine Tools) Moscow, Mashgiz, 1960. 157 p. 15,000 copies printed.

Ed.: Yu. S. Sharin; Tech. Ed.: N.A. Dugina; Scientific Ed. of Ural-Siberian Department (Mashgiz): G.A. Sarafannikova.

PURPOSE: This book is intended for technical personnel.

COVERAGE: Information concerning the automation of metal-cutting machines is given. Included are descriptions of modernized lathes, milling machines, and drilling machines. Automation schematics are given, and devices for feeding and chucking are described along with continuous production lines consisting of semi-automatic and automatic machine tools. The following are mentioned as having been the originators of automation in Soviet machine plants: T.G. Levin, Yu.L. Tetelyutin, V.F. Savateyev, V.G. Korobeynikov, and V.S. Pis'menskiy. There are no references.

~~Card 1/4~~

KOROBEYNIKOV, V.G.

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000824730003

Experience in the automation of universal metal-cutting equipment. Mashinostroitel' no.7:7-10 Jl '60. (MIRA 13:7)

(Izhevsk--Machine tools--Technological innovations)
(Automation)

L 54467-65 EWT(m)/EPF(n)-2/EWG(m)/EWP(t)/EWP(b) Pu-4 IJP(c) RWH/JD/WW/

ACCESSION NR: AT5013643 JG/GS/RM UR/0000/65/000/000/0096/0103 27
543.21:543.544.6:548.841 +546.3 26
B+1

AUTHOR: Kazantsev, Ye. I.; Kudusov, V. A.; Korobeynikov, V. L.; Lyashenko, V. A.

TITLE: Study of the separation of thorium from ions of certain metals on the anion exchanger AV-17 from nitric acid solutions

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Radiokhimicheskiye metody opredeleniya mikroelementov (Radiochemical methods for determining trace elements); sbornik statey. Moscow, Izd-vo Nauka, 1965, 96-103

TOPIC TAGS: column chromatography, anion exchange resin, thorium separation, nitric acid concentration

ABSTRACT: The article is devoted to the separation of gravimetric amounts of a series of di- and trivalent ions from thorium in nitric acid solutions on the strongly basic anion exchanger AV-17x6. The adsorbability of Th was found to depend strongly on the HNO_3 concentration. The dynamic capacity of the column for thorium was studied as a function of HNO_3 concentration, temperature, amount of anion exchanger, and presence of certain reagents. All the ions studied were divided into three groups according to their capacity of being adsorbed and

Card 1/2

L 54467-65

ACCESSION NR: AT5013643

eluted: (1) thorium ions, which are adsorbed in considerable quantitites and are not eluted to any appreciable extent by 7 N HNO_3; (2) ions of La, Ce(III), Bi, Pb, Co, Ni, Cu, U(VI), and Al, which are adsorbed in small quantities; (3) ions of Fe(III), Cr(III), Zn, Cd, Mg, Mn(II), and Ca, which are not adsorbed by the resin. Ions of metals of groups 2 and 3, with the exception of U(VI), are quantitatively eluted from the resin by 7 N HNO_3. Thus, the results of the experiments show that Th can be separated from metals of groups 2 and 3. It was found that U could be separated from Th most effectively on the KU-2 resin from HNO_3 solutions less than 2.5 N, and on the AV-17x5 resin from HNO_3 solutions more than 2.5 N. A simple procedure is proposed for the separation of the thorium isotope UX_1 from uranium solutions. Orig. art. has: 5 figures and 4 tables.

ASSOCIATION: None

SUBMITTED: 21Oct63 ENCL: 00 SUB CODE: IC, GC

NO REF SOV: 009 OTHER: 011

Card 2/2

KAZANTSEV, Ye.I.; KOROBEYNIKOV, V.L.; KUDUSOV, V.A.

Sorption of ions of certain metals on AV-17 anion exchangers from nitric acid solutions. Zhur. prikl. khim. 38 no.5:1143-1146 My '65. (MIRA 18:11)

1. Ural'skiy politekhnicheskiy institut imeni S.M. Kirova.

KOROBEYNIKOV, V.P.

Integrals of the equations for unsteady adiabatic motion of a gas. Dokl.AN SSSR 104 no.4:509-512 O '55. (MLRA 9:2)

1.Matematicheskiy institut imeni V.A.Steklova Akademii nauk SSSR. Predstavleno akademikom L.I.Sedovym.
(Gas flow)

KOROBEYNIKOV, V. P.

Korobeynikov, V. P.

"Investigation of some problems of unstabilized unidirectional movements of a gas." Acad Sci USSR. Mathematics Inst imeni V. A. Steklov. Moscow, 1956. (Dissertation for the Degree of Candidate in Physicomathematical Sciences).

Knizhnaya letopis'
No. 21, 1956. Moscow.

KOROBEYNIKOV, V.P.

CARD 1 / 2 PA - 1253

SUBJECT USSR / PHYSICS
AUTHOR KOROBEJNIKOV, V.P.
TITLE The Problem of the Strong Punctiform Explosion in a Gas with Vanishing Temperature Gradient.
PERIODICAL Dokl. Akad. Nauk, 109, fasc. 2, 271-273 (1956)
Publ. 7 / 1956 reviewed 9 / 1956

This problem was set by L.I. SEDOV, Dokl.Akad.Nauk, 52, No 1 (1946) and solved for the adiabatic motions of a gas behind the front of the shock wave. Here the same problem is solved for the case of strong heat exchange i.e. when the temperature gradient ($\partial T/\partial r = 0$) is lacking within the domain of the disturbed motion of gas. Also in the case of this problem the onedimensional spherical steady motion of the gas is automodel-like. For velocity, density, and temperature the formulae $u=f(\lambda)$; $\varrho=\varrho_1 g(\lambda)$, $T=c^2\theta_2/R$ apply. Here c is the velocity of the front of the shock wave, R - gas constant, θ_2 - a certain constant. As an independent constant the quantity $\lambda = r/r_2$ is taken, where $r_2=r_2(t)$ is the radius of the shock wave. Next, two ordinary differential equations for $f(\lambda)$ and $g(\lambda)$ and the boundary conditions of these quantities on the front of the shock wave are derived and written down. Furthermore it is true that in the symmetry center $f(0) = 0$. $f(\lambda)$ and $g(\lambda)$ do not depend on the coefficient of the adiabates, and γ is here essential only on the occasion of the computation of the energy balance. Finally a differential equation for the determination of $f(\lambda)$ is obtained, and after $f(\lambda)$ has been

of an adiabatic flow behind the front of the shock wave by L.I.SEDOV (see above).

INSTITUTION: Mathematical Institute "V.A.STEKLOV" of the Academy of Science in the USSR.

KOROBEYNIKOV, V.P

CARD 1 / 4 PA - 1908

SUBJECT USSR / PHYSICS
AUTHOR KOROBEJNIKOV,V.P.
TITLE Approximated Formulae for the Computation of the Characteristics of a Shock Wave on the Occasion of a Punctiform Explosion in a Gas.
PERIODICAL Dokl.Akad.Nauk,111, fasc.3, 557-559 (1956)
Issued: 1 / 1957

Here the problem of a punctiform explosion in a gas is investigated in consideration of counterpressure on the basis of the problem raised by L.I. SEDOV (Dokl.Akad.Nauk 52, No 1 (1946), Metody podobija i razmernosti v mechanike (= similarity and dimensional methods in mechanics), 3.edition, Moscow 1954). For the case of a spherical shock wave with the coefficient γ = 1,4 of the adiabatic curve the problem was solved in various works cited. One of the most important problems connected with punctiform explosion is the computation of the characteristics of motion for the domain immediately behind the front of the shock wave and the determination of the equation of motion of the front of the shock wave. The present work supplies simple approximation formulae for the computation of the parameters of the front of the shock wave for any γ for spherical, cylindrical and plane waves.
1.) A comparison of the dependencies of the gas velocity u_2 behind the wave front on the radius r_2 of the shock wave in the case of large and small r_2 shows that the function $u_2(r_2)$ changes but little on the occasion of transi-

AUTHOR KOROBEYNIKOV V.P. PA - 3048

TITLE On the Propagation of a Strong Spherical Explosion Wave in a Heat-Conducting Gas.
(O rassprostranenii sfericheskoy vzryvnoy volny v teploprovodnom gaze -Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 5, pp 1006-1009 (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT The present report deals with the automodel-like problem of a strong punctiform explosion in a perfect gas, taking account of heat conduction. At the point of time $t = 0$, in one point of the gas at rest, a large, but finite energy E_0 is assumed to be liberated momentarily i.e. an explosion is assumed to take place. Thereafter, a spherical wave is propagated. The density of the gas at rest is assumed to be equal to ϱ_1 and the initial pressure of the gas p_1 is neglected.
At first the initial system of the equations of the gas dynamics for the problem under investigation is written down, also, the boundary conditions in the explosion center and on the shock wave are explicitly given. In these equations pressure is eliminated by means of the equations of state. Next, dimensionless variables are introduced. As the problem is automodel-like, the above mentioned gas dynamic system of equations is equivalent to a system of ordinary differential equations. Also the boundary conditions can be transformed into dimensionless variables. The system of equations and the boundary conditions then depend parametrically upon the constants γ and

Card 1/2

A. The author determined the numerical solution of this problem for $\gamma = 1{,}4$ and $A = 1{,}048$ in his dissertation for a candidateship at the Mathematical Institute of the Academy of Science of the USSR (Moscow 1956). According to the opinion of the author, the heat exchange between the gas particles is more intense than the heat exchange due to molecular thermal conduction. The solution of the problem is shown in a diagram, it represents a new model for the description of the initial stage of the development of a strong explosion. The temperature in the explosion center is finite and decreases from the maximum of the center to the minimum value on the shock wave with increaseing r. The temperature gradient in the center is equal to zero and attains its highest value on the shock wave. Pressure distribution remains qualitatively the same as in the case of adiabatic and "isothermal" models of the current.
(3 illustrations)

ASSOCIATION Mathematical Institute "V.A.STEKLOV" of the Academy of Science of the USSR
PRESENTED BY L.I.SEDOV, Member of the Academy
SUBMITTED 16.10.1956
AVAILABLE Library of Congress
Card 2/2

KOROBEYNIKOV, V. P.

20-6-6/47

AUTHOR: Korobeynikov, V. P.

TITLE: The Exact Solution of the Nonlinear Problem of an Explosion in a Gas of Variable Initial Density (Tochnoye resheniye nelineynoy zadachi o vzryve v gaze pri peremennoy nachal'noy plotnosti).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 6, pp. 947-948 (USSR)

ABSTRACT: In the initial moment $t = 0$ a finite energy E is instantaneously released in a gas in a point along a straight line or along a surface, i. e. an explosion takes place. Then a spherical, cylindrical or plane shock-wave of explosion spreads in the gas. Behind the shock wave a nonsteady, unidimensional motion of gas with spherical, cylindrical or plane symmetry takes place. The initial pressure p_1 is constant, but the initial density depends on the distance from the center of explosion. First the set of equations for the adiabatic motion of the gas behind the wave is written down. The problem is reduced to the determination of the solution of the set of equations just mentioned with consideration of the secondary conditions given here. To this are added a condition for the inversion center $v(0,t) = 0$ and conditions for the front of the shock-wave. These conditions are given here. Then the expressions for the solution of the problem discussed here are given without calculation. A formula is also given for the variation of

Card 1/2

The Exact Solution of the Nonlinear Problem of an Explosion in a Gas of Variable Initial Density. 20-6-6/47

the pressure directly behind the shock-wave. The solution given here was obtained from the exact solution by L. I. Sedov. There are 2 Slavic references.

ASSOCIATION: Mathematical Institute AN USSR imeni V. A. Steklov AN USSR (Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR).

PRESENTED: June 22, 1957, by L. I. Sedov, Academician

SUBMITTED: June 18, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Korobeynikov, V. P. and Ryazanov, Ye. V. (Moscow) 40-22-2-17/21

TITLE: The Construction of Rigorous, Discontinuous Solutions for the One-Dimensional Equations of Gas Dynamics and Their Applications (Postroyeniye tochnykh razryvnykh resheniy uravneniy odnomernoy gazodinamiki i ikh prilozheniya)

PERIODICAL: Prikladnaya matematika i mekhanika, 1958, Vol 22, Nr 2, pp 265-268 (USSR)

ABSTRACT: During the last time discontinuous solutions obtained particular interest in the investigation of one-dimensional motions of real gases in presence of shock waves. Only few similar solutions could be found till now in this case. However, new kinds of solutions can be constructed with the aid of a rigorous solution given by Sedov. This solution of Sedov has the form :

$$v = -\frac{1}{\mu}\frac{d\mu}{dt} r \quad ; \quad p = \mu^{\gamma\nu}\left\{C + \frac{\nu(\gamma-1)}{2(s+2)} BP(x)\right\}$$

$$\varrho = \mu^{\nu} \xi^{s} P'(x); \quad \frac{d\mu}{dt} = \pm \mu^{2}(A + B\mu^{\nu(\gamma-1)})^{1/2}$$

Card 1/2

here P(x) is an arbitrary function, $\mu = \mu(t)$ a function of time, s is a certain constant, $\xi = r\mu$ is a Lagrange coordinate, furthermore it holds $x = \xi^{s+2}$.
The author applies this solution in order to construct rigorous solutions for the case when the shock wave moves in a resting gas with variable density under constant pressure. Here at first the functions P(x) and r(t), which denotes the radius of the shock wave, are calculated. From these values the other magnitudes interesting for the flow can be determined. There are 3 references, 2 of which are Soviet, and 1 American.

SUBMITTED: October 22, 1957

1. Gas flow--Mathematical analysis 2. Shock waves--Mathematical analysis

SOV/20-121-4-11/54

10(4), 24(3)

AUTHOR: Korobeynikov, V. P.

TITLE: One-Dimensional Automodel Motions of a Gas in a Magnetic Field (Odnomernyye avtomodel'nyye dvizheniya provodyashchego gaza v magnitnom pole)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 4, pp 613-615 (USSR)

ABSTRACT: The author investigates one-dimensional unsteady adiabatic motions of an ideal electrically conductive gas with cylindrical and plane waves. The magnetic field may be perpendicular to the trajectories of the particles. The conductivity of the gas is considered to be infinite; the viscosity and the heat conductivity are neglected. The equations of motion which correspond to the above mentioned assumptions are given in an explicit form. Since these equations do not contain any dimensional constants, the motion will be an automodel one if the initial conditions and boundary conditions of the problem contain only two dimensional constants with independent dimensions. This paper uses the denotations and the terminology of L. I. Sedov. The author introduces dimensionless

Card 1/3

SOV/2o-121-4-11/54

One-Dimensional Automodel Motions of a Gas in a Magnetic Field

variables and he gives a system of ordinary differential equations which is equivalent to the above mentioned system of partial differential equations. Next, the author gives a particular solution of the ordinary differential equations. More general solutions of this type were investigated in previous papers (Refs 2, 3). The above mentioned ordinary differential equations have 2 algebraic integrals, viz. an integral of adiabaticity and an integral of "freezing in" (integral vmorozhennosti). Therefore the solution of any automodel problem may be reduced to the integration of a system of 2 ordinary equations. In a special case, there is also an energy integral and the problem may be reduced to the solution of one equation. Shock waves may also exist in the motion of the gas. The following automodel problems may be solved by the integration of the above-mentioned system of ordinary differential equations: 1) The determination of the motion of a conducting gas from the given initial data (Cauchy (Koshi) problem). 2) The problem of the motion of a plane or cylindrical conducting piston in a gas. 3) The problem of the strong explosion (electrical discharge).

Card 2/3

SOV/20-121-4-11/54

One-Dimensional Automodel Motions of a Gas in a Magnetic Field

There are 1 figure and 7 references, 5 of which are Soviet.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematical Institute imeni V. A. Steklov, AS USSR)

PRESENTED: April 1, 1958, by L. I. Sedov, Academician

SUBMITTED: March 28, 1958

Card 3/3

PHASE I BOOK EXPLOITATION SOV/3762

Konferentsiya po magnitnoy gidrodinamike. Riga, 1958.

Voprosy magnitnoy gidrodinamiki i dinamiki plazmy; trudy Konferentsii. (Problems in Magnetohydrodynamics and Plasma Dynamics; Transactions of a Conference) Riga, Izd-vo AN Latviyskoy SSR, 1959. 343 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut fiziki.

Editorial Board: D.A. Frank-Kamenetskiy, Doctor of Physics and Mathematics, Professor; A.I. Vol'dek, Doctor of Technical Sciences, Professor; I.M. Kirko, Doctor of Physics and Mathematics; V.Ya. Veldre, Candidate of Physics and Mathematics; V.O. Vitol, Candidate of Physics and Mathematics; Yu.M. Krumin'; and V.Ya. Kravchenko.

Ed.: A. Teytel'baum; Tech. Ed.: A. Klyavinya

PURPOSE: This book is intended for physicists working in the field of magnetohydrodynamics and plasma dynamics.

COVERAGE: This volume contains the transactions of a conference held in Riga, June 1958, on problems in applied and theoretical magnetohydrodynamics. The objects of the conference were the investigation of the basic trends in theoretical and applied magnetohydrodynamics, establishing contact between the people doing research in different branches of magnetohydrodynamics, and promoting the participation of theoretical physicists in problems in applied magnetohydrodynamics. More than 160 persons from different parts of the Soviet Union took part in the conference, and 55 papers were read. Similar conferences are to be held regularly in the future; the next such conference is scheduled to be held in Riga in June 1960. In this present collection of the transactions of the conference, most of the papers and comments on papers are presented by the authors themselves in an abridged form. The book is divided into two parts: the first part deals with problems in theoretical magnetohydrodynamics and plasma dynamics, and consists of 35 articles on such aspects of the problem as the application of magnetohydrodynamics in astrophysics (D.A. Frank-Kamenetskiy), magnetohydrodynamics and the investigation of cosmic-ray variations (L.I. Dorman), acceleration of plasma in a magnetic field (G.V. Gordeyev and A.I. Gubanov), stability of shock waves and magnetohydrodynamics (A.I. Akhiyezer). The second part, consisting of 33 articles, deals with problems of experimental magnetohydrodynamics, including the application of physical simulation for investigation of electromagnetic processes in liquid metals (I.M. Kirko) and the development of electromagnetic pumps (P.G. Kirillov), at the Institute of Physics of the Academy of Sciences, Latvian SSR. Several articles are devoted to induction pumps, electromagnetic crucibles, electromagnetic stirrers for molten metals, and their application in the metallurgical industry including schematic diagrams of their power-supply systems. References are given at the end of most of the articles.

Card 7/12

7

21(7)

AUTHORS: Korobeynikov, V. P., Ryazanov, Ye. V. SOV/20-124-1-13/69

TITLE: On the Solutions of Equations of Magnetic Gas Dynamics in the Case of Vanishing Temperature Gradients (O resheniyakh uravneniy magnitnoy gazodinamiki pri nulevom gradiyente temperatury)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 1, pp 51-52 (USSR)

ABSTRACT: The authors investigate one-dimensional motions of an electrically conductive perfect gas with cylindrical and plane waves. The conductivity of the gas is assumed to be infinite, and viscosity is disregarded. The magnetic field is vertical to the trajectories of the gas particles. In the cylindrical case the magnetic lines of force can be straight lines which are parallel to the symmetry axis, concentric circles with their center on the axis, or also helical lines. The equations of motion and their particular solutions are explicitly written down and explained. The solutions obtained are also suited for the construction of a solution with shock waves. In conclusion, an equation is given for the motion of shock waves. There are 2 Soviet references.

Card 1/2

SOV/20-124-1-13/69

On the Solutions of Equations of Magnetic Gas Dynamics in the Case of Vanishing Temperature Gradients

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematics Institute imeni V. A. Steklov of the Academy of Sciences, USSR)

PRESENTED: August 11, 1958, by L. I. Sedov, Academician

SUBMITTED: July 25, 1958

Card 2/2

KOROBEYNIKOV, V. P., RYAZANOV, E. V. (Moscow)

"Some Solutions of One-Dimensional Magnetohydrodynamic Problems and Their Application to Problems of Shock Wave Propagation."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

KOROBEYNIKOV, V. P. (Moscow)

"On Strong Explosions in a Perfect Compressible Medium."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000824730003-4"

KOROBEYNIKOV, V.P.

81830

S/179/60/000/02/004/032
E081/E241

10.2000

AUTHORS: Kvashnina, S. S., and Korobeynikov, V. P., (Moscow)

TITLE: Solution of Some Problems of the Motion of Air, Allowing for Dissociation and Ionisation

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1960, Nr 2, pp 34-41 (USSR)

ABSTRACT: At moderate pressures, and temperatures below 1000°K, the properties of air are adequately described by the equation of state for a perfect gas $p = R\rho T/\mu$, with constant heat capacity, constant γ (= C_p/C_v) and constant molecular weight μ. At temperatures above 1000°K, the heat capacity depends on temperature, and above 2000°K dissociation of molecules and ionisation of atoms occur, both of which appreciably affect all thermodynamic properties, so that internal energy, enthalpy and sound velocity depend not only on temperature but also on density or pressure. Below 1000°K, the enthalpy h depends on sound velocity (a) according to $h = a^2/(\gamma - 1)$. Between 1000 and 20 000°K the relationship is expressed by Eqs (1.1) and (1.2) where

Card 1/6

...ation, using ... is given by (2.2). The time t_b and

81831

S/179/60/000/02/004/032
E081/E241

Solution of Some Problems of the Motion of Air, Allowing for Dissociation and Ionisation

the coordinate r_b at which a shock wave arises are found from the conditions (2.3). For waves propagated in the positive direction, Eqs (2.1) to (2.3) lead to (2.4) where the derivatives are calculated at the point $C = C_b$. If the compression waves are adjacent to stationary gas and the shock waves arise at the boundary, the conditions (2.4) may be written as (2.5). If a plane piston moves in a sufficiently long tube according to the law $dr_n/dt = U = kt$, with $T_0 \geqslant 1000$, the table on p 38 gives the value of Δ (the ratio of t_b in air to t_b in an ideal gas) for various initial temperatures and entropies. As $k \to -\infty$, one obtains flow of gas into a vacuum, accompanied by recombination. Using the solution (2.1) for this case and taking the initial data: $a_0 = 1300$ m/sec, $S = 2.118$ cal/g deg, the solid lines in Fig 1 are obtained; the dashed lines represent the curves for an ideal gas. The velocity of flow into a vacuum $v(0) = -8780$ m/sec for air and $v(0) = -6490$ m/sec for an ideal gas.

Card 3/6

81831

S/179/60/000/02/004/032
E081/E241

Solution of Some Problems of the Motion of Air, Allowing for Dissociation and Ionisation

(2) Calculation of the parameters at the braking point. Using the thermodynamic functions (1.1) to (1.7), the parameters at the first discontinuity and the values of T_0, p_0, ρ_0 can be calculated at the braking point for the motion of a blunt body in air with supersonic velocity. The results of the calculations are given in Table 3 for air and ideal gas.
* The first line corresponds to values determined from tables (Ref 7), the second to formulae (1.1), (1.7).
It is evident from the table that dissociation and ionisation lead to considerable lowering of temperature at the discontinuity and at the braking point in relation to an ideal gas and to an increase in pressure and density. The pressure, however, changes relatively little.
(3) Expansion of a piston in quiescent air with constant velocity. The system of equations for the motion of air at the front of a shock wave may be written in the form (4.1). According to Ref 10 these equations may be transformed to a system of ordinary differential equations (foot of p 39) by the transformation using the dimensionless parameters

Card 4/6

81831

S/179/60/000/02/004/032
E081/E241

Solution of Some Problems of the Motion of Air, Allowing for Dissociation and Ionisation

$$\lambda = \frac{r}{Dt}, \quad V = \frac{t}{r} v, \quad H = \frac{h}{D^2}$$

where D is the shock wave velocity. The values $\nu = 1, 2, 3$ correspond to plane, cylindrical and spherical pistons. At the shock wave front $\lambda = 1$ and V, H are known values from calculations at the first discontinuity (Ref 9). Calculations have been carried out for $\nu = 2$, $D/a_1 = 8.085$, $p_1 = 1$ atm, $T_1 = 288°K$, and are plotted in Figs 2 and 3 (the dashed curves are for a perfect gas). The pressure and density at a shock wave in air are higher and the temperature lower than in a perfect gas. The influence of dissociation on sound velocity is small.

(4) The flow around a cone with zero angle of attack. This problem leads to the integration of Eq (5.1) with the boundary conditions (5.2) and (5.3), where u is the velocity component along the cone axis, v is the component perpendicular to the axis, ω_2 is the angle of the discontinuity and the index k signifies a magnitude at the surface of the cone. Calculations

Card 5/6

KOROBEYNIKOV, V.P. (Moskva)

One-dimenisional movements of gas accompanied by shock waves located in a magnetic field. PMTF no.2:47-53 Jl-Ag 60. (MIRA 14:6)

(Gas flow) (Shock waves) (Magnetohydrodynamics)

16.7600

77987
SOV/40-24-1-15/28

AUTHORS: Korobeynikov, V. P., Ryazanov, Ye. V. (Moscow)

TITLE: Solutions of Equations of One-Dimensional Magneto-Hydrodynamics, and Their Application to Problems of Spreading-Wave Shocks

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol 24, Nr 1, pp 111-120 (USSR)

ABSTRACT: Various cases are presented in which the equations describing the plane or cylindrically symmetric motion of an electrically conducting gas given by:

$$-\rho\frac{dv}{dt}=\frac{\partial p^*}{\partial r}+\frac{2(\nu-1)h_\varphi}{r},\qquad -\frac{1}{\rho}\frac{d\rho}{dt}=\frac{\partial v}{\partial r}+\frac{(\nu-1)v}{r}$$

$$-\frac{1}{2}\frac{dh_z}{dt}=h_z\left(\frac{\partial v}{\partial r}+\frac{(\nu-1)v}{r}\right)-r^{1-\nu}h_z^{1/2}\frac{\partial}{\partial r}\left(\nu_m r^{\nu-1}\frac{\partial h_z^{1/2}}{\partial r}\right) \qquad (1.1)$$

$$-\frac{1}{2}\frac{dh_\varphi}{dt}=h_\varphi\frac{\partial v}{\partial r}-h_\varphi^{1/2}\frac{\partial}{\partial r}\left[\nu_m r^{-1}\frac{\partial}{\partial r}(rh_\varphi^{1/2})\right]$$

Card 1/9

Solutions of Equations of One-Dimensional Magneto-Hydrodynamics, and Their Application to Problems of Spreading-Wave Shocks

77987
SOV/40-24-1-15/28

$$-\frac{dp}{dt} = \gamma p\left(\frac{\partial v}{\partial r} + \frac{(\nu-1)v}{r}\right) - 2(\gamma-1)\nu_m\left\{\frac{1}{r^2}\left[\frac{\partial}{\partial r}(rh_\varphi^{1/2})\right]^2 + \left(\frac{\partial h_z^{1/2}}{\partial r}\right)^2\right\} \quad (1.2)$$

$$\left(p^* = p + h, \quad h = h_z + (\nu-1)h_\varphi, \quad h_z = \frac{H_z^2}{8\pi}, \quad h_\varphi = \frac{H_\varphi^2}{8\pi}\right)$$

can be integrated. Infinitely conducting stationary motions; unsteady automodel and non-automodel motions with shocks; motions in which the velocity depends linearly on r; isothermal flows, as well as the problem of an impulsive gas discharge are considered. The research done here is a continuation of prior work done by the authors both jointly and independently.

Card 2/9

Here, H_z and H_φ are the components of the magnetic field intensity; ν_m is the magnetic viscosity; $\nu = 1, 2$ correponds to the plane and cylindrical case, respectively; and the remaining notation is standard. The magnetic field is always perpendicular to the velocity vector, and for $\nu = 1$, $h_\varphi = 0$. For infinite conductivity $\nu_m = 0$, and for isothermal flows, the fifth equation is replaced by $\partial T/\partial r = 0$ or $p = \theta(t)\rho$. The shock conditions for unsteady motions corresponding to the conservation of mass and momentum and the continuity of the electric field and energy are given by:

$$\rho_2(v_2 - u) = -\rho_1 u, \qquad v_2\rho_2(v_2 - u) + p_2^* = p_1^* \qquad (u = dr_2/dt) \tag{1.5}$$

$$h_{z2}\rho_1^2 = h_{z1}\rho_2^2, \qquad h_{\varphi 2}\rho_1^2 = h_{\varphi 1}\rho_2^2 \tag{1.6}$$

$$(v_2 - u)\left(\frac{\rho_2 v_2^2}{2} + \frac{p_2}{\gamma - 1} + h_2\right) + v_2 p_2^* = -u\left(\frac{p_1}{\gamma - 1} + h_1\right) \tag{1.7}$$

for a medium at rest. The subscript 1, denotes the quantities in the undisturbed flow; the subscript 2, their values behind the shock; u is the shock speed and $r_2(t)$ is its radius. For the stationary case with $\nu_m = 0$ and $\nu = 2$, the authors give five integrals:

$$p = c_1\rho^\gamma, \quad \rho v r = c_2, \quad h_\varphi = c_3 r^2\rho^2, \quad h_z = c_4\rho^2, \quad \frac{v^2}{2} + \frac{\gamma p}{(\gamma - 1)\rho} + \frac{2h}{\rho} = c_5 \tag{2.1}$$

where $c_1, \ldots, c_5$ are arbitrary constants. This was also solved by K. Stanyukov (Zh. E. T. F., Vol 36, Nr 6, 1959). There exist two asymptotic curves on which $\partial v/\partial r = \infty$ and $v = a^* = \sqrt{(\gamma p + 2h)/\rho}$, i.e., the gas speed is equal to the total sound speed. A flow is possible only in the region between the two cylinders corresponding to these curves. Let r_0 and r_1 be the radii of these limiting circles.

Solutions of Equations of One-Dimensional Magneto-Hydrodynamics, and Their Application to Problems of Spreading-Wave Shocks

77987
SOV/40-24-1-15/28

$U = A_1 t^n$, the piston radius being zero and the other flow quantities being proportional to negative powers of r, initially. For $\nu_m = 0$, the problem is automodel, if these powers and n obey a given relation and the solution can be obtained by numerical methods (given by the first author: Dokl. An SSSR, Vol 121, Nr 4, 1958). Several graphs are given depicting the dependence of the flow quantities on the space variable. A condition is also given insuring the automodelness of the problem for finite conductivity. When the velocity is a linear function of the radius, a solution for adiabatic gas flows without shocks was obtained by Kylikovskiy (Dokl. AN SSSR, Vol 114, Nr 5, 1957). For arbitrary γ, a solution is written down containing an arbitrary function of the space variable for the axisymmetric case. For $\gamma = 2$ an analogous solution is written which was derived by the second author (Priklad. mat.

Card 6/9

Solutions of Equations of One-Dimensional Magneto-Hydrodynamics, and Their Application to Problems of Spreading-Wave Shocks

77987
SOV/40-24-1-15/28

i mekh., 1959, Vol 23, Nr 1) in terms of two arbitrary functions of the space variable. The authors state that these two solutions can be used, by suitably choosing the arbitrary constants and functions, to connect the flow across a shock front. This was carried out in several cases in Priklad. matem. i mekh., 1958, Vol 22, Nrs. 2, 5. Here, the authors discuss in detail the solution for arbitrary γ for the problem of a strong shock (in the gas dynamical sense) starting from the conditions across a shock front given by G. Whitham (J. of Fluid Mech., 4, pp 337-360, 1958). The flow quantities and piston radius are then found for the compression of gas by a piston. In a previous paper (Dokl. AN SSSR, Vol 124, Nr 1, 1959), the authors showed that exact solutions exist for isothermal, infinitely conducting gases depending on an arbitrary function of the space variable or time in which the velocity also was a certain linear function of the space variable. The problem with shocks was solved using a

Card 7/9

Solutions of Equations of One-Dimensional Magneto-Hydrodynamics, and Their Application to Problems of Spreading-Wave Shocks

77987
SOV/40-24-1-15/28

solution containing an arbitrary function of the time. For isothermal flows in which $\nu_m = \nu_m(t)$, one can find particular solutions of (A) when h_z or h_φ is absent and which contain arbitrary constants. Starting from a particular solution involving an arbitrary function of the space variable, the authors discuss in detail and construct the solution across the shock. This solution is then used to obtain an exact solution of the following problem of an impulsive gas discharge: At time $t = 0$, there is a cylindrical column of gas whose assumed high temperature makes the gas infinitely conducting; a magnetic field with given intensity is assumed to be "fixed" in the column and directed parallel to the cylinder axis; the initial density is constant at $t = 0$ and the total pressure in the gas is assumed to be constant; at $t = 0$ a current begins to flow through the the column in the axial direction according to a given law.

Card 8/9

82515

S/020/60/133/04/05/031
B019/B060

24.2120

AUTHORS: Korobeynikov, V. P., Karlikov, V. P.

TITLE: On the Interaction of Strong Explosion Waves With an Electromagnetic Field

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4, pp. 764-767

TEXT: The first part of the paper deals with the investigation of a point explosion in an ideal gas with infinitely large electrical conductivity, assuming the existence of a weak homogeneous magnetic field. Owing to the weak magnetic field, the motion of the medium can be neglected in first approximation, and the problem has an axial symmetry on account of the homogeneous magnetic field. Proceeding from the induction equation, the equations (3) are obtained for the radial and the transverse components of the magnetic field, and are then discussed. An already known formula is then given for the calculation of the current in the zone of gas motion. In the second part, the authors discuss the emission of electromagnetic waves caused by strong shock

Card 1/3

82515

On the Interaction of Strong Explosion Waves With an Electromagnetic Field

S/020/60/133/04/05/031
B019/B060

waves in conducting media within an electric or magnetic field, and also the increase in the electrical conductivity of the gas behind the wave front of the shock waves caused by the interaction of the above electromagnetic waves with the shock waves. It is assumed in the further tasks that the electrical conductivity is infinitely large behind the shock wave front, but vanishing in front of it, and furthermore, the influence of the electric or the magnetic field on the gas motion is neglected due to the smallness of the electromagnetic field. Proceeding from the assumption that the electric and magnetic field strengths are equal in front of and behind the shock wave, the vector product (4) is obtained for the field strength in front of the shock wave. Plane waves are examined next, with $\vec{E}$ parallel to the Y-axis and $\vec{H}$ parallel to the Z-axis. (6) is then obtained for (4) and it is shown that H_z and E_y also satisfy equations $E_y + H_z = \Phi(\xi)$, $E_y - H_z = F(\eta)$, besides the wave equations. Here, $\xi = x - ct$, $\eta = x + ct$, $\Phi(\xi)$ and $F(\eta)$ are arbitrary functions, and c is the light velocity. Finally, the propagation of a plane shock wave and a strong explosion on a plane are investigated as concrete examples. In the first example, expressions are found for

Card 2/3

PHASE I BOOK EXPLOITATION SOV/5711

Korobeynikov, Viktor Pavlovich, Nina Sergeyevna Mel'nikova, and Yevgeniy Vasil'yevich Ryazanov

Teoriya tochechnogo vzryva (Theory of Point Detonation) Moscow, Fizmatgiz, 1961. 332 p. 5,000 copies printed.

Ed.: S. N. Shustov; Tech. Ed.: I. Sh. Aksel'rod.

PURPOSE: This book is intended for scientists interested in shock-wave propagation, and for aspirants and students in advanced courses in gas dynamics at schools of higher education. It may also be used by engineers concerned with problems of detonation.

COVERAGE: The book contains the results of work by Soviet and non-Soviet scientists on the theory of point detonation. The point-detonation theory arose in connection with the necessity of describing phenomena which take place in uniform media during detonations of charges of small volume and weight, but which develop high energy. The point-detonation theory makes it possible to obtain, with an accuracy sufficient for practical purposes,

Card 1/14

much necessary data on the nature of the unsteady motion developed during a detonation. It should be mentioned that this theory may also be applied to problems of the flow of a superhigh-speed gas stream around blunt-nosed slender bodies and to problems of shock-wave propagation during electrical discharges and detonation of fine metal wires through which a pulsed current is passed. Over the last few years many works published mainly in various Soviet and non-Soviet journals have dealt with investigations of the motion of a gas during point detonations. In view of the absence of a complete presentation of the point-detonation theory, which is important in investigating various problems of gas dynamics, the authors of the book have endeavored to give a systematic presentation of its principal conditions and the more important results of research employing this theory. The book contains eight chapters. Chapter I sets forth general equations of one-dimensional unsteady motions and some mechanical and thermodynamic relationships. Here the problems of point detonation are formulated and the main results of studies dealing with this problem are reviewed. In Chapter II self-

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000824730003

simulating [automodeling] problems of detonation in an ideal gas having constant and variable initial density are reviewed, and the solution is given to the problem of the motion of a gas expelled by a piston. The approximation method of calculating problems which are not self-simulating is given in Chapter III. This method is based on the linearization of a gas-dynamics equation about a self-simulating solution. The stated method is used to solve point-detonation problems by taking into account counter-pressure and density variation with altitude, and also, to solve problems of the motion of a gas expelled by a piston. The application of the point-detonation theory to the aerodynamics of thin bodies is reviewed. Chapter IV contains the results of the numerical solution of a non-self-simulating spherical-charge detonation problem, and a comparison of these results with some experimental data. Also examined in Chapter IV are the problems of the asymptotic behavior of the solution near the detonation center and the laws of shock wave attenuation at great distances. In Chapter V approximation formulas are derived for calculating the parameters of spherical, cylindrical, and plane detonation waves. In Chapter VI a method is given for setting up some exact solutions which describe the one-dimensional unsteady flow of a gas with shock waves. The application of this method to detonation phenomena is discussed. The aforementioned chapters review problems of adiabatic motions of an ideal gas with constant heat capacities. The last two chapters include problems formulated on the basis of other assumptions. Thus, in Chapter VII, problems of powerful detonation in an ideal gas under conditions of nonadiabatic motion in a disturbed zone are studied. One of the methods for calculating radiation is shown here. Chapter VIII deals with a number of problems connected with point detonation in a slightly compressible uniform medium, e.g., water. An investigation of the general characteristics of solutions to problems concerning powerful detonations is given for a broad class of self-simulating media. The book does not deal with questions connected with the calculation of gas viscosity, the effects of gravity, or ionization and dissociation processes since there are still many unsolved problems

in this area. A number of results obtained by the authors and published earlier in journal articles are included. Many of the subjects covered in the book were topics in a series of reports delivered at seminars on hydrodynamics at the Moscow State University. A bibliography of Soviet and non-Soviet literature is given at the end of the book. The book was written as follows: Chapters IV, V, Section 3 of Chapter II, and Section 6 of Chapter III were written by V.P. Korobeynikov; Chapters III and VIII, by N.S. Mel'nikova; Chapters II and VI, by Ye.V. Ryazanov; Chapter I, by Korobeynikov and Mel'nikova; Chapter VII, by Korobeynikov and Ryazanov; and Sections 2, 6, 8, and 9 of Chapter II, by Mel'nikova and Ryazanov. The authors participated jointly in compiling the problems reviewed in Sections 3, 4, and 5 of Chapter III, Sections 2 and 6 of Chapter IV, and Section 1 of Chapter VIII. It should be mentioned that Sections 3, 4, 5, 6, 7, and 9 of Chapter VIII were written by N.S. Mel'nikov and N.N. Kochina mainly on the basis of their articles. The authors thank Leonid Ivanovich Sedov for his valuable remarks concerning many of the problems reviewed in the book; V. P. Karlikov, for his help in writing Section 5 of Chapter III; and Yu. L. Yakimov, for submitting the material for Section 8 of Chapter VIII and for his valuable comments. There are 74 references: 57 Soviet, and 17 English.

TABLE OF CONTENTS:

26742
S/040/61/025/003/019/026
D208/D304

3.2600(1538,1502)

AUTHORS: Karlikov, V.P., and Korobeynikov, V.P. (Moscow)

TITLE: On perturbations of the electromagnetic field under the action of a shock wave when conductivity is discontinuous

PERIODICAL: Akademiya nauk SSSR. Otdeleniye tekhnicheskikh nauk. Prikladnaya matematika i mekhanika, v. 25, no. 3, 1961, 554 - 556

TEXT: Electromagnetic waves are investigated here by subjecting them to the action of spherical shock waves, spreading in a weak electromagnetic field. It is assumed that the mechanism of generation of the electromagnetic wave is related to the appearance of the discontinuity in conductivity on the passage of the shock wave through gas. Velocity of the shock wave D(t) where t - time, is assumed known. If the subscript (1) denotes the region in front of the shock wave and subscript (2) the region behind it, then

Card 1/6

$$H_1 = H_2, \quad E_{1\tau} = E_{2\tau} \tag{1}$$

where E_τ - tangential component of electric field vector. In view of infinite conductivity of gas behind the shock wave, one has $E_2 = -\frac{1}{c} v_2 \cdot H_2$ in a moving coordinate system, and

$$E_{1\tau} = -\frac{1}{c}[(v_2 - D) \circ H_1]_\tau \tag{2}$$

in the stationary coordinate system. In the medium of zero conductivity and $\mu = \varepsilon = 1$,

$$\frac{1}{c}\frac{\partial E}{\partial t} = \operatorname{rot} H, \qquad \frac{1}{c}\frac{\partial E}{\partial t} = -\operatorname{rot} E. \tag{3}$$

The spherical shock wave is then considered. Initial magnetic and electric fields are taken to be H_0 and E_0 respectively. The spherical coordinate system is used (r, Θ, φ) and θ is the angle of H. The following cases are then solved. 1) For $E_0 = 0$, $H_0 \neq 0$, and moof the shock wave given by

$$D = \frac{dr_2}{dt} = \frac{c\varphi(\xi_2, r_2)}{\alpha\psi(\xi_2, r_2)}, \quad \xi_2 = ct - r_2, \quad r_2(0) = 0$$

$$\varphi(\xi_2, r_2) = \xi_2 \sum_{k=0}^{m} g_k \xi_2^k [\xi_2 + (k+2) r_2], \quad 0 \leqslant m < \infty \tag{7}$$

$$\psi(\xi_2, r_2) = r_2^2 - \xi_2 \sum_{k=0}^{m} g_k \xi_2^k [(k+2) r_2 + \xi_2 + \xi_2^2 r_2^{-1} (k+3)^{-1}]$$

where q_k are constants, the solution is

$$E_r = E_\theta = 0, \qquad H_\varphi = 0$$

$$E_\varphi = H_0 \sin\theta \frac{\xi}{r^2} \sum_{k=0}^{m} g_k \xi^k [\xi + (k+2) r] \tag{8}$$

$$H_r = -\frac{2H_0}{r^3} \xi^2 \cos\theta \sum_{k=0}^{m} \frac{g_k}{k+3} \xi^k [\xi + (k+3) r] + H_0 \cos\theta$$

On perturbations of the ...

$$H_\theta = -\frac{H_0}{r}\xi\sin\theta\sum_{k=0}^{m} g_k\xi^k\left[k+2+\frac{\xi}{r}+\frac{\xi^2}{(k+3)r^2}\right]-H_0\sin\theta \qquad (8)$$

2) If $D = D_0$ = const. $H_0 \neq 0$, $E_0 \neq 0$ and H_0 orthogonal to E_0, then the solution is found by putting $\lambda = r/D_0t$, separating the variables in (3) and solving the resulting equations. The final result is

$$\begin{aligned}
H_r &= H_0A\left(B+\frac{2}{\delta^2}\frac{1}{\lambda}-\frac{2}{3\delta^4}\frac{1}{\lambda^3}\right)\cos\theta \\
H_\theta &= H_0A\left(-B-\frac{1}{\delta^2}\frac{1}{\lambda}-\frac{1}{3\delta^4}\frac{1}{\lambda^3}\right)\sin\theta+E_0A_1\left(-\frac{1}{\delta}+\frac{1}{\delta^3}\frac{1}{\lambda^2}\right)\cos\varphi \qquad (9)\\
H_\varphi &= -E_0A_1\left(-\frac{1}{\delta}+\frac{1}{\delta^3}\frac{1}{\lambda^2}\right)\sin\varphi\cos\theta \\
E_r &= E_0A_1\left(-B_1-\frac{2}{\delta^3}\frac{1}{\lambda}+\frac{2}{3\delta^4}\frac{1}{\lambda^3}\right)\sin\varphi\sin\theta
\end{aligned}$$

$$E_\theta = -E_0 A_1\left(B_1 + \frac{1}{\delta^2}\frac{1}{\lambda} + \frac{1}{3}\frac{1}{\mu^4}\frac{1}{\lambda^3}\right)\sin\varphi\cos\theta$$

$$E_\varphi = H_0 A\left(-\frac{1}{\delta} + \frac{1}{\delta^3}\frac{1}{\lambda^2}\right)\sin\theta - E_0 A_1\left(B_1 + \frac{1}{\delta^2}\frac{1}{\lambda} + \frac{1}{3\delta^4}\frac{1}{\lambda^3}\right)\cos\varphi \qquad (9)$$

where

$$A = \frac{3\alpha\delta^4}{\alpha(4\delta^3 - 3\delta^2 - 1) - 3(1-\delta^2)}, \quad B = \frac{-3(1-\delta^2) - \alpha(1+3\delta^2)}{3\alpha\delta^4}$$

$$A_1 = \frac{3\delta^4}{1 + 3(\alpha+1)\delta^2 - 4\delta^3 - 3\alpha\delta^4}, \quad B_1 = \frac{-1 - 3(\alpha+1)\delta^2 + 3\alpha\delta^4}{3\delta^4} \qquad \left(\delta = \frac{D_0}{c}\right)$$

3) (8) can be utilized for approximate determination of electromagnetic parameters if D(t) is different from (7) and can be used if D(t) and $r_2(t)$ are tabulated. Also if the initial position of the electromagnetic wave is given by $r = r_0$, then the substitution $\xi = r - r_0 - ct$ should be used in (8). There are 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-

26742

On perturbations of the ... S/040/61/025/003/019/026
D208/D304

language publication reads as follows: R. Gallet, Propagation and production of electromagnetic waves in a plasma, Supplem. Nuovo, Cimento, 1959, v. 13, ser. 10, N. 1, pp. 234 - 256.

SUBMITTED: February 18, 1961

Card 6/6

KULIKOVSKIY, Andrey Gennadiyevich; LYUBIMOV, Grigoriy Aleksandrovich; KOROBEYNIKOV, V.P., red.; BRUDNO, K.F., tekhn. red.

[Magnetohydrodynamics] Magnitnaia gidrodinamika. Moskva, Fizmatgiz, 1962. 246 p. (MIRA 15:7)
(Magnetohydrodynamics)